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A new global research agenda for food

Ten ways to refocus research from feeding people to nourishing them

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Around 44% of 129 countries in the world today are struggling with both undernutrition and obesity simultaneouslyⁱ. Global food systems are failing to keep all of us fed, let alone in keeping us healthy. There is growing evidence that how food is grown, distributed, processed and marketed plays a vital role in determining dietary quality, and hence the distribution of ill-health around the world.

Working out how to improve the quality of diets requires urgent interdisciplinary research to support concerted policy action. The efforts required from the international community will have to be on an unprecedented scale — equivalent to that marshalled to tackle HIV/AIDS, malaria and smoking. That's our conclusion from having compiled the report published in September commissioned by the Global Panelⁱⁱ on Agriculture and Food Systems for Nutrition. Its conclusions support a call to scientists, governments and donors to create a new research agenda on how the world can craft and sustain healthy food systems that provide nutritious diets for all.

Poor-quality diets have become the most significant driver of sickness in the world — collectively responsible for more of the global burden of sickness than unsafe sex, drugs, alcohol and tobacco combined. This rising nutrition crisis now affects every nation. In the next few decades, food systems will be subject to major stresses arising from population and income growth, urbanisation, globalisation, climate change, and increasingly scarce natural resources, making the situation worse — unless something is done.

Inadequate diets affect everyone, from the poorest in the world to wealthy elites. Poor diets are responsible for problems associated with undernutrition, including a lack of essential vitamins and minerals. But they also drive much of the obesity and chronic disease epidemics (including type 2 Diabetes and heart disease) that are sweeping the globe. One in three people currently suffers from some form of malnutrition. A quarter of children under age five are stunted, with diminished physical and cognitive capacities while two billion people are overweight or obese. Across Africa and Asia, the impact of undernutrition on gross domestic product is 11% annuallyⁱⁱⁱ.

This is not a problem that countries can grow, or develop, their way out of. As economies expand, many social factors improve but the quality of diets does not. Hunger and famine have been greatly reduced, thanks to rapid poverty reduction and rising agricultural productivity. But middle- and low-income countries are now following the well-worn, highly damaging path from undernutrition to obesity.

As the Food and Agriculture Organization (FAO) meets to discuss the UN's Decade of Action on Nutrition in Rome next week, researchers, governments, industry experts and funders need to consider their part in meeting these challenges. In the light of such large-scale interconnected trends, solutions to the health and mortality threats posed by inadequate diets will only be found by fixing the entire food system. Piecemeal won't do. No one government ministry or sector of activity 'owns' the quality of diets available to the consumer, and the effects of the withdrawal of public sector responsibility are all too clear.

Ten priorities for research.

Below we set out a manifesto for a new global research agenda for nutrition, primarily aimed at researchers, funders and governments, but with important messages for all stakeholders.

- 1) **Identify entry points to pivot food systems.** Food systems are dynamic, encompassing interacting activities that include production, storage, transport and trade, processing and transformation, and retail. New research is needed to determine how each part of system can better contribute to the larger goal of making high-quality diets more available, affordable and appealing. For example, what needs to be done to reduce food spoilage in storage, nutrient losses during transformation, and improve food quality with minimal processing? Studies should involve site-specific appraisals with qualitative research and mapping, thorough value chain analyses, and multi-country studies that delve into the structure and function of food systems behind what people eat. Donors and funders of science should promote initiatives that are interdisciplinary, involve consumers as well as policymakers, and analyse what incentives exist for actors in the food system to act differently.
- 2) **Make more data on diets widely available.** Given that diet is the number one risk factor in the global burden of disease, it is remarkable that so few data are available to document diets in ways that are comparable across cultures, geographies and time. This has hampered global consensus on what constitutes a healthy diet. A pilot project jointly run by the WHO and the FAO, the Global Individual Food consumption data Tool (GIFT),^{iv} is focusing on some of these questions, but with too few resources to be truly effective. GIFT will need a large team to collate many more national surveys and develop guidelines for future national surveys. Other initiatives include the Global Dietary Database project, and a proposed World Gallup Poll initiative that seeks to include questions on people's diet quality. Such efforts are poorly-funded and piecemeal. We should establish open access data portals on diet data like the WHO's global database on child malnutrition. The latter incorporates hundreds of surveys of child heights and weights, which has proved invaluable for documenting progress, and for holding stakeholders accountable.
- 3) **Characterise what makes a healthy diet.** People don't choose nutrients, they select combinations of foods in differing amounts which collectively make up a diet. How do these patterns of diet patterns affect health? While there is research linking different dietary patterns to health, there is much we do not know. Single food-disease pairings are the basis of risk factor analysis in the global burden of disease studies, but they tell us little about diets as a whole. There are studies on the value of certain types of diets, e.g. the Mediterranean Diet but few dietary studies from low-income countries, where even the nutritional profile of many foods, including important indigenous foods, remains poorly known. A better understanding of the dose-response relationships is needed. Is it better to eat a little of each food category frequently, or a large amount less frequently? Food researchers need to be more creative and research funders more bold in assessing the health implications of commonly eaten combinations of foods.
- 4) **Analyse how to tackle different forms of malnutrition simultaneously.** Credible

information on what works to both reduce undernutrition and reduce the risk of obesity and related diseases is essential if governments and industry are to scale up investments aimed at improving diets. While the evidence on successful programmes that tackle undernutrition is accumulating, these tend to be at a small scale.^v Evidence on how to tackle unhealthy diets associated with obesity tend to be more population-based and thus more difficult to evaluate. There is analysis on the effect of interventions to improve the environments around people that affect the availability, affordability and appeal of food, such as taxes, school food standards and nutrition labelling^{vi}, but the impact on population sub-groups is insufficiently researched, and there is a lack of studies showing impacts on obesity as an outcome. The most serious gap is on how intervening further back into the food system can improve diet quality (see Point 1). Governments, foundations, trusts, and other supporters of public health, food systems and agriculture research need to urgently orientate their energies towards the factors that shape diets, because diets are at the base of the new reality: the coexistence of these many forms of malnutrition.

- 5) **Understand “long chain” and “short chain” food systems.** One proposed solution to support healthier eating is “short chain” models, such as markets in which local farmers sell products directly to consumers, or direct food procurement systems where school meals programmes source food from family farms. By contrast, in “long chain” systems foods travel long distances or go through multiple transactions before reaching consumers. Research is needed to assess what differing combination of these systems will be most effective in ensuring high-quality diets -- enough food and the right kind of food at the right price accessible to all. The implications for environmental sustainability including ways to reduce losses and emissions across the entire value chain, as well as social, and economic benefits of these different types of system, will also need to be probed.
- 6) **Analyse incentives for businesses to improve diets.** Food systems shape consumer diets in a wide variety of ways by determining which foods are available, affordable and desirable. The most numerous stakeholders in food systems globally are private entities -- from farmers to food processors, wholesalers and retailers. The private sector controls many of the levers that could tilt food systems towards higher-quality diets, and has the capacity to respond innovatively to dietary targets and regulations. More nuanced understanding is needed of what incentives are needed to tilt these levers in a healthier direction than is currently the case. We need better mechanisms for public-private dialogue to shape and then implement research priorities that will enable the food system to deliver higher-quality diets. Pre-competitive collaborations across sectors, perhaps facilitated by public actors, could be important to shift sectors collectively and overcome disincentives for single firms to conduct research in isolation. The Business Partnerships for Nutrition Research hosed by GAIN is one such example. To strengthen accountability in the public-private domain, research is needed on which partnerships tend to be more diet-improving than others. Such research exists in the health field, but not in the nutrition field.
- 7) **Seek to shape healthy diets through a climate lens.** Changing and variable climates will directly affect the availability of different foods from land and sea, and their nutritional value. New research is needed to understand how diversification of local food systems may address the dual challenges of agricultural resilience and nutritional diversity for healthy diets. At the same time, changes in diets will drive significant change in land and water use and greenhouse gas emissions^{vii}. Some of the most micronutrient dense foods, whose consumption must be increased in poor communities,

including fruits, vegetables and animal sourced foods, also place substantial demands on environmental resources. Research on more resource-efficient and less polluting production of these foods, for instance in the context of rapidly changing livestock systems, is crucial. New research could also help identify significant win-wins for environments and diets. Evidence suggests for instance, that a projected 51% increase in food-associated greenhouse gas emissions by 2050 would fall to 7% if WHO guideline diets were adopted globally^{viii}. This points to an urgent need to develop effective methods for measuring both the sustainability and nutritional value of diets, extending current work on the carbon footprints of commodities to food-system wide analyses, and to use these in research on context-specific solutions.

- 8) **Study supply and demand.** The current consumption of vegetables, legumes, fish, nuts, seeds, and fruits *everywhere in the world* is far below that that recommended by the World Health Organization. In many of the same parts of the world, other people are eating too much fat, processed meat, sugar-laden drinks and salt which underpins the global epidemic of diet-related diseases. The foods available in any food environment – the range of options from which a consumer may choose – is influenced not only by consumer preferences, but also by relative prices and supply. Ultra-processed foods and sugar-laden beverages are found in remote areas of Nepal and Ethiopia, but a choice of vegetables, fruits and other nutrient-rich foods are not. In part, this is because investment in improving production and availability of agricultural commodities has for decades been focused on a small number of cereals. Investment in global public sector research institutions on crop improvement is still mostly focused on grains like rice, wheat and maize. About 45% of private sector agricultural research investment is on maize^{ix}. Public and private research on neglected nutritious commodities needs to increase with a focus on their productivity and resilience in the face of pests, diseases and climate change. This is a particular challenge for the global public research community broadly led by the Consultative Group on Integrated Agricultural Research (CGIAR). The CGIAR's recent commitment to mainstreaming nutrition in all crop and livestock breeding programmes, and to direct more research to healthy agriculture and food systems, should be strongly supported by donors and replicated more widely by governments' own research systems. Promoting supply has to be coupled with promoting demand. More research is needed to educate, inform and encourage consumers to make positive choices framed by healthful diets rather than individual commodities--in low- as well as high-income settings.
9. **Identify the appropriate economic levers for change.** Every US\$1 in proven nutrition programmes offers roughly US\$16 of benefits in return^x. But we do not know enough about where exactly in the food system investment any one policy, regulation or programme intervention will generate the largest net payoffs. Policy makers from a number of countries such as Indonesia, Rwanda and Peru are calling for such evidence. The economic gains from improving food system and diet quality have to be credibly calculated for different sub-sectors and sub-systems under various scenarios relating to demand growth, climate change, potential industry innovation and shifts in consumer preferences.
10. **Fix metrics.** Shifting the dial on diet quality via food systems cannot be at the expense of other sustainable development goals. Growing calls for pricing the “real” cost of water consumption or carbon production have promoted a wider understanding of the so-called economic externalities of individual and government choices; we need the same approach for diets. We must be able to answer questions such as, what will be the overall benefits and costs of consuming more locally-sourced fruits and vegetables

versus importing them? The relationship between health, energy use, water use and greenhouse gas emissions involves tradeoffs, but the large variety of individual foods within each food category means the scope for finding win-win solutions is great. More fine-grained analyses of, for example, the health, water, energy and greenhouse gas emission profiles of the production and consumption of different vegetables, are desperately needed.

What now?

Funders who support agriculture and nutrition research need to focus much more of their resources on food intake and on diets. The era of commodity research aimed at feeding a starving world is over; a new era has begun that requires us to nourish all consumers globally in ways that can be sustained environmentally, economically and culturally. High-income countries do not have a monopoly on poor-quality diets — nor do they yet have the solutions. Scientists and the academic journals in which they publish need to become more pluralistic in the methods and approaches that they support. Narrow disciplinary lenses cannot help us in addressing today's challenges.

In the Symposium in Rome on December 1-2, which meets to discuss the UN Decade of Action on Nutrition, delegates have an important opportunity to agree on the priority entry points that can help us pivot food systems. The actual policies and programmes used will vary between contexts, but they need to align a coherent food systems responses with people's dietary needs. Countries, businesses and civil society organisations should be focused on making changes at multiple entry points. A transparent annual accounting is needed of what countries are actually doing to improve different points in the food system, the goal of these actions, and their effects.

Policy makers urgently need to recognise that diets are now the number one driver of disease, compromising economic productivity and wellbeing as never before. The priority challenge for upcoming G20 and G8 meetings is to embrace the problems associated with failing food systems as a collective global responsibility. There is a real opportunity for African, Asian and Latin American Development Banks, FAO and the World Bank to develop scorecards to track how nutrition-sensitive national urban and rural food systems are. If we don't diagnose our food systems correctly, we can't fix them. And if we don't fix them soon, the world's health and economic problems of the future will be so much greater than they are today.

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